Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Promoting Investment in the 3550-3700 MHz Band	)	GN Docket 17-258
	)	
	)	
Petitions for Rulemaking Regarding the Citizens Broadband Radio Service	)	RM-11788 (Terminated)
	)	RM-11789 (Terminated)

COMMENTS OF T-MOBILE USA, INC.

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T-Mobile USA, Inc. ("T-Mobile")[1/] submits these comments in response to the Notice of Proposed Rulemaking ("*NPRM*")[2/] in the above-referenced proceeding seeking comment on proposals to modify the rules governing the 3550-3700 MHz band ("3.5 GHz band") Citizens Broadband Radio Service ("CBRS") to encourage investment, promote technological innovation, facilitate new use cases, and maintain U.S. leadership in Fifth Generation ("5G") technologies. T-Mobile applauds the Commission's recognition that new rules will better foster the development of the 3.5 GHz band. It urges the Commission to adopt its proposals that would conform the rules governing the 3.5 GHz band to other licensed wireless services and to begin the process of conducting an auction for this band.

I. INTRODUCTION AND SUMMARY

In only a few short decades, wireless services and connectivity have transformed American daily life. The benefits stemming from mobile wireless innovation are only expected

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1/ T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

2/ *Promoting Investment in the 3550-3700 MHz Band; Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, Notice of Proposed Rulemaking and Order Terminating Petitions, 32 FCC Rcd. 8071 (2017) ("*NPRM*").

to increase with the deployment of 5G wireless technologies – technologies that will create over two million jobs and add approximately $420 billion to the nation's annual Gross Domestic Product.[3/]

Realizing this 5G future, however, will require that the Commission make additional spectrum available – including mid-band spectrum. In the *Mid-Band Notice of Inquiry*,[4/] the Commission recognized the value of mid-band spectrum for 5G services, noting that it is well-suited for mobile wireless broadband because of its propagation characteristics (*e.g.*, wide coverage, low latency, and high reliability).[5/] The 3.5 GHz band *NPRM* is a crucial first step toward making this much-needed mid-band spectrum available for 5G use.

As T-Mobile has previously detailed, other regions and countries are already taking steps to make spectrum in the 3 GHz band, including the 3.5 GHz band, available for 5G operations.[6/] In fact, as the Commission acknowledges, "it has become increasingly apparent that the 3.5 GHz Band will play a significant role as one of the core mid-range bands for 5G network deployments

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3/ *See Smart Cities: How 5G Can Help Municipalities Become Vibrant Smart Cities*, CTIA (2017), https://www.ctia.org/docs/default-source/default-document-library/how-5g-can-help-municipalities-become-vibrant-smart-cities-accenture.pdf.

4/ *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd. 6373 (2017) ("*Mid Band Notice of Inquiry*").

5/ *See id.* ¶ 6.

6/ *See* T-Mobile USA, Inc. Petition for Rulemaking, GN Dkt. No. 12-354, RM-11789, at 6-7 (filed June 19, 2017) ("T-Mobile Petition for Rulemaking") (discussing actions taken by the United Kingdom, Ireland, Australia, Japan, and China); Comments of T-Mobile USA, Inc., GN Dkt. No. 17-183, at 7-9 (filed Oct. 2, 2017) (discussing actions taken by China, Japan, Singapore, Hong Kong, South Korea, India, the United Kingdom, and Germany). Since these filings, China has officially reserved 3.3-3.6 GHz band for 5G, and it is expected to make the 3.6-4.2 GHz band available as well. *See* Monica Alleven, *China reserves spectrum for 5G, says more low-band frequencies coming: report*, FIERCEWIRELESS (Nov. 15, 2017), https://www.fiercewireless.com/wireless/china-reserves-spectrum-for-5g-says-more-low-band-frequencies-coming-report. Italy and Spain will also be awarding spectrum in the 3.6-3.8 GHz band for 5G uses in 2018. *See Spectrum for 4G and 5G*, QUALCOMM, 19 (October 2017), https://www.qualcomm.com/media/documents/files/spectrum-for-4g-and-5g.pdf.

throughout the world."[7/] The 3.5 GHz band is likely to be ready to auction and use before the adjacent spectrum in the 3.7-4.2 GHz band, which remains under consideration in the *Mid-Band Notice of Inquiry* and has not yet been allocated for mobile services and identified for 5G mobile wireless broadband. Hence, as the only mid-band spectrum now available for 5G in the U.S., the 3.5 GHz band is critically important to the introduction of 5G technologies. To maintain its leadership position in 5G, the United States must seize the opportunity to make this valuable spectrum available to American consumers and businesses in a way that promotes the highest levels of investment and innovation.

While T-Mobile is disappointed that the Commission did not propose to adopt, or further consider, all of the changes it requested in its Petition for Rulemaking,[8/] it generally supports the rules proposed in this proceeding and urges the Commission to move forward quickly to auction the Priority Access Licenses ("PALs") in the 3.5 GHz band on terms that will better facilitate robust investment. In particular, the Commission should:

- Authorize PALs on a standard, ten-year license term with a renewal expectancy.
- Adopt a performance requirement of coverage to 40% of the population for PALs.
- Use Partial Economic Areas ("PEAs") to license PALs.
- Impose a spectrum aggregation limit of 30 megahertz for PALs.
- Permit partitioning and disaggregation of PALs in secondary market transactions.
- Allow bidding on specific blocks within the first 70 megahertz of PAL spectrum at 3550-3620 MHz with the remaining 30 megahertz of the PAL spectrum available on a priority basis in cases where a channel at 3550-3620 MHz becomes unavailable.
- Make all seven PAL licenses available at auction, regardless of the number of applications received.
- Prohibit Spectrum Access System ("SAS") Administrators from publicly disclosing Citizens Broadband Radio Service Device ("CBSD") registration information.
- Relax the emission limits that apply to CBSDs and end user devices.

7/ *NPRM* ¶ 2.

8/ *See generally* T-Mobile USA, Inc. Petition for Rulemaking.

II. THE PAL LICENSE TERM SHOULD BE EXTENDED TO TEN YEARS

Under current rules, PALs are limited to a three-year license term with no right of renewal.[9/] The Commission proposes to increase the PAL license term to ten years and eliminate the requirement that PALs automatically terminate at the end of the license term. It also seeks comment on possible performance requirements for PALs.[10/]

A. A Ten-Year PAL Term Will Encourage Greater Investment and Innovation in the Band

To maximize investment and innovation in the 3.5 GHz band, thereby maintaining U.S. leadership in 5G, the Commission should adopt a ten-year license term for PALs. Longer license terms will create an environment more conducive to investment in 3.5 GHz networks. As T-Mobile has detailed,[11/] network deployment is a multi-year process even in typical circumstances and includes standardizing a new frequency band, developing and certifying equipment, introducing a new band into end-user devices, and deploying infrastructure. A longer license term with a right of renewal can best account for this process. A ten-year license term will also reduce the risk that a PAL licensee – having won a license at auction and invested in deploying a network – will face stranded investment after acquiring its authorization. Instead, a ten-year term would – as the Commission acknowledges – "afford each licensee sufficient time to design and acquire the necessary equipment and devices and to deploy facilities across the license area."[12/]

9/ *See* 47 CFR § 96.25(b)(3).

10/ *NPRM* ¶ 13.

11/ *See* T-Mobile Petition for Rulemaking at 11-12.

12/ *NPRM* ¶ 13; *see also Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 8014, ¶ 176 (2016) (finding that "a 10-year license term will give licensees sufficient certainty to invest in their systems, particularly as the new technology is still nascent and will require time to fully develop") ("*Spectrum Frontiers Report and Order*").

A longer PAL term would also benefit General Authorized Access ("GAA") device use in the 3.5 GHz band, particularly in combination with the rules that require operability across the 3.5 GHz band.[13/] Licensee investment will help drive what is required to be a unified equipment ecosystem for licensed *and* unlicensed spectrum. Without sufficient licensee investment, a robust equipment ecosystem for unlicensed use is less likely to develop in the 3.5 GHz band. Longer license terms are therefore critical to the success of the band for both licensed and unlicensed users. The standard ten-year license term the Commission has adopted for many of its licensed wireless services[14/] has afforded wireless providers the certainty needed to invest heavily in the nation's wireless infrastructure and helped create today's strong wireless equipment ecosystem. The Commission should adopt the same ten-year term here and provide the 3.5 GHz band the greatest opportunity for technological growth.

Longer license terms will be particularly useful for promoting investment in rural areas. Wireless providers' business models often dictate that buildout in more rural sectors of a licensed area occurs after economic viability in that licensed area has been established through service in more densely populated areas. Longer license terms will allow providers additional time to fully implement their business plans and reach rural parts of their licensed areas.

Contrary to suggestions by some, the Commission should not retain the three-year PAL term with no possibility of renewal and provide incumbents with bidding credits in the re-auction of the licenses.[15/] Such an approach would still leave too much uncertainty as to a licensee's ability to retain its authorization, depressing investment. Entities will not invest in spectrum that

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13/ *See* 47 CFR § 96.39(b).

14/ *See NPRM* ¶ 13.

15/ *See id.* ¶ 19.

they are at risk of losing at a re-auction in the near future, even with bidding credits. Likewise, there is no need for a hybrid licensing approach in which PALs are divided into subsets with different license terms.[16/] *No* potential licensees – all of whom will be required to make substantial network investments – will be interested in brief license terms without a renewal expectancy. For true "spot" (*i.e.*, very short) market use of spectrum, entities would be better served seeking spectrum leases or accessing the band via GAA use. Similar concerns about efficient and intensive use of spectrum can be addressed through leasing and secondary market transactions, which will ensure that spectrum is put to effective use by entities that value it most. In addition, a ten-year license term will not create barriers to exit, as licensees that no longer need their licenses may return their authorizations to the Commission or make them available on the secondary market.

Longer license terms will preserve investments made in the 3.5 GHz band to date. As noted above, longer license terms will *increase* investment in the 3.5 GHz band. The current investments by potential SAS and Environmental Sensing Capability ("ESC") Administrators will be maintained. Those entities will continue to be required to arbitrate federal incumbent, PAL, and GAA use and the Commission can continue to test and certify them.

B. The Commission Should Adopt Population-Based Performance Requirements for PALs

If the Commission increases the PAL term to ten years – as it should – the Commission should also impose population-based performance requirements on the licenses. Because at least some of the applications for the 3.5 GHz band will be focused on small-cell deployment and may be used to enhance capacity, population-based coverage requirements are most appropriate.

16/ *See id.* ¶ 16.

Geographic-based requirements, in contrast, would be incompatible with small-cell deployment in the band and may inhibit certain innovative uses.

In particular, the Commission should adopt population-based requirements similar to those adopted in the *Spectrum Frontiers* proceeding for mobile and point-to-multipoint services in the 28 GHz, 37 GHz, and 39 GHz bands. In those bands, the Commission imposed performance obligations requiring that, to meet the standards for renewal, a licensee provide coverage to 40% of the population of the license area and use the facilities to provide service.[17/] The Commission determined that "this level of coverage strikes the appropriate balance between ensuring sufficient use of the spectrum and allowing licensees flexibility to deploy an emerging technology which may be more suitable for smaller coverage areas."[18/]

As in the millimeter wave bands, the 3.5 GHz band will be used to support emerging technologies, some of which may be suitable for smaller coverage areas.[19/] Accordingly, it is appropriate for the Commission to also adopt a performance requirement of coverage to 40% of the population for licenses in the 3.5 GHz band. In addition – as in the millimeter wave bands – the Commission should set the performance deadline for the end of the license term with performance evaluated at renewal. As the Commission suggests,[20/] before a licensee is required to meet its performance obligations, licensed spectrum will be available for opportunistic GAA use when the spectrum is not being used by the PAL licensee. That will ensure that spectrum can be used even if the licensee itself is not doing so. Therefore, no performance requirements

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17/ *See Spectrum Frontiers Report and Order* ¶ 206.

18/ *Id.*

19/ *See NPRM* ¶ 2 (noting that the "3.5 GHz Band will play a significant role as one of the core mid-range bands for 5G network deployments throughout the world").

20/ *See id.* ¶ 17.

before the end of a license term are necessary. Of course, the certainty of having access to the band through holding a PAL supports an end-of-term performance requirement, and a 40% benchmark is appropriate in this instance.

The Commission should also use the recently adopted renewal framework for Wireless Radio Services ("WRS") licenses, including the safe harbors, to evaluate whether a PAL licensee has met its population-based performance requirements at renewal.[21/] As the Commission stated, "ensuring that licensees in WRS bands operate under the same basic set of rules . . . will promote investment in wireless networks."[22/] In addition, the safe harbors "will serve the public interest by reducing filing burdens on licensees" – thereby allowing licensees to focus more of their resources on deployment – and will "concentrat[e] scarce Commission resources on reviewing renewal filings that warrant close scrutiny."[23/]

III. PALS SHOULD BE ISSUED ON A PEA BASIS AND A 30 MEGAHERTZ SPECTRUM AGGREGATION LIMIT SHOULD BE IMPOSED

The current rules define the license area for a PAL as a single census tract, of which there are *over 74,000* in the United States.[24/] The Commission seeks comment on a variety of issues concerning PAL size and, relatedly, access to PALs at auction.

21/ *See Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, Second Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd. 8874 (2017). The CBRS was excluded from the new renewal framework because it did not have performance obligations at the time the order was adopted. *See id.* at Appendix I.

22/ *Id.* ¶ 1.

23/ *Id.* ¶ 16.

24/ *See* 2010 Census Tallies of Census Tracts, Block Groups & Blocks, https://www.census.gov/geo/maps-data/data/tallies/tractblock.html (last visited Dec. 5, 2017).

First, the Commission seeks comment on increasing the PAL geographic license area.[25/] To further its goals of "stimulat[ing] additional investment, promot[ing] innovation, and encourag[ing] efficient use of spectrum resources[,]"[26/] T-Mobile agrees that the Commission should increase the license size of PALs to PEAs.

Unlike PEAs, census tracts do not reflect economic and geographic boundaries that correspond with actual market needs. While it may be possible to combine census tract licenses to reflect market realities, doing so introduces unnecessary risk and complexity, which will decrease investment and potentially delay deployment of service.

In addition to the mismatch between geographic boundaries and market demands, small geographic licenses present technical challenges that can lead to inefficient use of spectrum. Equipment in the 3.5 GHz band will likely use a Time Division Duplex air interface with the uplink and downlink operating on the same channel, but at different times. This creates an increased potential for interference when adjacent-area licensees are operating uplink and downlink at different times. Smaller license areas dramatically increase the number of borders where coordination is necessary to avoid this and similar challenges and increase the likelihood that those borders fall in densely populated areas where demand is greatest. Licensees' different business plans may make it difficult to fully coordinate operations. If they are unable to do so, they may be required to introduce guard bands or inefficient scheduling or reduce coverage near border areas, all of which will reduce efficient use of spectrum and its benefits to the American consumer.

25/ *See NPRM* ¶ 23.

26/ *Id.* ¶ 23.

The Commission has recognized the benefits of PEA-based licensing in multiple other bands, noting that it encourages investment by a wide variety of entities. In the *Incentive Auction Report and Order*, for example, the Commission explained that PEAs "will promote participation by both larger and smaller wireless providers, including rural providers, and encourage new entrants."[27/] The Commission also noted that a PEA licensing approach "will encourage entry by providers that contemplate offering wireless broadband service on a localized basis, yet at the same time will not preclude carriers that plan to provide service on a much larger geographic scale."[28/]

This is especially the case because PEAs are themselves a compromise between larger and smaller license areas. As the Commission detailed in the *Spectrum Frontiers Report and Order*, licensing on a "PEA basis strikes the appropriate balance between facilitating access to spectrum by both large and small providers and simplifying frequency coordination while incentivizing investment in, and rapid deployment of, new technologies."[29/] Further, since "PEAs also nest into EAs but can be broken down into counties" they "allow[] operators to combine or partition their PEAs into the license areas of their choice."[30/] The Commission correctly concluded that PEA-sized licenses, along with an ability to combine or partition licenses, would "aid in the rapid deployment of these licenses."[31/] Moreover, the Commission recently announced that it would license additional millimeter wave bands on a PEA basis in the

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27/ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd. 6567, ¶ 44 (2014) ("*Incentive Auction Report and Order*").

28/ *Id.* ¶ 71.

29/ *Spectrum Frontiers Report and Order* ¶ 82.

30/ *Id.*

31/ *Id.*

Second Report and Order in the *Spectrum Frontiers* proceeding.[32/] Accordingly, issuing PALs on a PEA basis would preserve consistency between 5G operations in the 3.5 GHz band and in other bands.[33/]

Second, the Commission asks whether it should – in light of the proposed changes to PALs, including an increase in the license area – modify the current 40 megahertz spectrum aggregation limit in the band.[34/] T-Mobile agrees that it should. Spectrum aggregation limits remain an important means of preventing market concentration of critical inputs such as spectrum, ensuring that multiple providers have access to spectrum. This is particularly necessary in the 3.5 GHz band, where there is limited spectrum available for licensing. Therefore, the Commission should reduce the aggregation limit to 30 megahertz, instead of retaining the current 40 megahertz limit.

As discussed above, the 3.5 GHz band is presently the only mid-band spectrum available for 5G wireless broadband, and as the Commission has recognized, mid-band spectrum is important for network deployment.[35/] Allowing one entity to dominate licensed 3.5 GHz spectrum in a market area, as the current aggregation limit permits – or worse, allowing a single

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32/ *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177, *et al*., FCC 17-152, ¶¶ 28, 50 (rel. Nov. 22, 2017).

33/ While the Commission declined to use PEAs as the licensing mechanism for the 28 GHz band, its decision was based on the fact that licenses in that band are currently issued on a Basic Trading Area basis and cannot be readily reformed into either EAs or PEAs.

34/ *See NPRM* ¶ 27.

35/ *See Policies Regarding Mobile Spectrum Holdings*, Report and Order, 29 FCC Rcd. 6133, ¶ 18 ("As providers deploy next-generation mobile networks, the engineering properties and deployment capabilities of the mix of particular spectrum bands in providers' holdings have become increasingly important."); *see also* Commissioner O'Rielly, *A Mid-Band Spectrum Win in the Making*, Federal Communications Commission (July 10, 2017), https://www.fcc.gov/news-events/blog/2017/07/10/mid-band-spectrum-win-making ("Next generation wireless networks will require high, mid and low band spectrum."); *Mid Band Notice of Inquiry* ¶ 6 (stating that many mid-band frequencies could be "well-suited for next-generation wireless services").

entity to secure all the licensed 3.5 GHz spectrum by eliminating the aggregation limit altogether – will give that entity an unfair advantage in developing technology and networks at mid-band frequencies. A 30 megahertz limit, in contrast, would allow three entities to secure spectrum in an individual market, with no single entity able to dominate the market. A 40 megahertz limit may have been appropriate under T-Mobile's proposal, in which 150 megahertz would have been available for PALs,[36/] but with only 70 megahertz of mid-band spectrum available for licensing, a 30 megahertz limit would better support competition.

IV. PARTITIONING AND DISAGGREGATION SHOULD BE PERMITTED

The Commission proposes to allow PALs to be partitioned and disaggregated in secondary market transactions.[37/] The Commission should adopt this proposal. Partitioning and disaggregation, combined with the performance requirements discussed above, will help ensure that licensed spectrum in the 3.5 GHz band is put to use. As the Commission correctly points out, "the ability to partition and disaggregate a PAL will be an effective way to improve spectral efficiency and facilitate targeted network deployments[.]"[38/] In particular, partitioning and disaggregation will permit licensee flexibility, facilitate faster service deployment, and allow entities with limited needs to enter into transactions tailored to the area or amount of spectrum they desire,[39/] thereby benefitting small entities and promoting the goals of the Communications Act ("Act"). Thus, regardless of whether the Commission adopts all of the other proposals in the *NPRM* to revise the PALs rules, it should allow partitioning and disaggregation.

36/ *See* T-Mobile Petition for Rulemaking at 9.

37/ *See NPRM* ¶ 31.

38/ *Id.*

39/ *See, e.g.*, Comments of Microsoft Corporation, GN Dkt. No. 12-354, at 9 (filed Feb. 20, 2013) (arguing that the Priority Access tier should be limited to mission-critical uses and to indoor or private campus use).

V. PUBLIC DISCLOSURE OF CBSD REGISTRATION INFORMATION SHOULD BE PROHIBITED

Under the current rules, SAS Administrators must make CBSD registration information available to the general public, with licensees' identities protected.[40/] The Commission proposes to adjust the rule to prohibit SASs from publicly disclosing CBSD registration information that could "compromise the security of critical network deployments or be considered competitively sensitive."[41/] Although this proposal is a step in the right direction, it will not sufficiently protect carrier networks. There is no meaningful reason for making *any* carrier network information public. Public disclosure of CBSD registration information carries great risk – a risk that there is no reason to assume.

SAS Administrators will be required to collect a significant amount of data concerning users' network configurations, uses, and technical parameters. Preventing the release of any of this information would better protect the security of users' networks and reduce competitive concerns, with no countervailing harm. Since public disclosure is unnecessary for GAA deployment and use, disclosing CBSD registration information to the general public does not serve any relevant purpose. SAS administrators are already required to work with each other to coordinate frequency assignments and avoid interference between CBSDs, and potential GAA users can work directly with SAS Administrators to determine where they can deploy CBSDs on a GAA basis.

VI. ALL SEVEN PAL LICENSES SHOULD BE AVAILABLE FOR AUCTION

Currently, the rules provide that, in a particular license area for a specific auction, the Commission will make available one fewer PAL than the total number of PALs applied for, up

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40/ *See* 47 CFR § 96.55(a)(3).

41/ *See NPRM* ¶ 37.

to a maximum of seven.[42/] If only one application for a PAL is submitted, then the Commission will make no PAL available, and the spectrum will remain accessible solely for GAA use – the only exception to this rule is for certain rural areas, in which the Commission will make a PAL available even when there is only one applicant.[43/] The Commission proposes to amend its rules to (i) eliminate the limit on the number of PALs in a particular license area that the Commission will make available, and (ii) assign PALs even when there is only one applicant in a given license area.[44/] The Commission should adopt this proposal and treat the 3.5 GHz band as it does other bands with respect to its auction processes.

As the *NPRM* correctly notes, the Commission's proposals for longer-term, renewable PALs licensed for a larger geographic area will make PALs more attractive and useful for a wide variety of licensees.[45/] As a result, it is likely that there will be more applicants for PALs than there are PALs available in any given license area. Accordingly, by making all PALs available the Commission would adhere to the requirements of the Act to conduct auctions among mutually exclusive applicants.[46/] In addition, eliminating the limit on the number of PALs that may be auctioned would better fulfill the Act's goals of promoting competition, disseminating licenses among a variety of applicants, and generating auction revenue.[47/]

In the unlikely event that there are applicants for fewer PALS than there are PALs available, the Commission should award licenses without an auction, consistent with its

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42/ *See* 47 C.F.R. § 96.29.

43/ *See id*.

44/ *See NPRM* ¶ 42.

45/ *See id.* ¶ 44.

46/ *See* 47 U.S.C. § 309(j).

47/ *See id*.

treatment of spectrum in other bands.[48/] The mere existence of potential GAA use does not create the type of mutual exclusivity that the Act envisions for auctions. First, GAA users do not submit "mutually exclusive applications . . . for [a] license."[49/] They submit no applications at all – they are licensed by rule. Second, GAA users, under their license-by-rule, cannot exclude others from the spectrum they use, so no use can be considered mutually exclusive. Only PAL holders, by virtue of their ability to block other PAL and GAA use of spectrum, can create the type of mutual exclusivity contemplated in the Act.

VII. APPLICANTS SHOULD BE PERMITTED TO BID ON SPECIFIC LICENSE BLOCKS

Under the current rules, PAL licensees will not bid on specific spectrum blocks at auction. Instead, when a PAL licensee seeks to use spectrum, the SAS Administrator will assign the licensee use of the amount of spectrum for which it is licensed.[50/] The Commission seeks comment on whether it should amend its rules to allow PAL licensees to bid on specific channel assignments.[51/]

As T-Mobile has stated in the past, carriers require a stable and predictable spectrum environment in order to engage in effective network planning, and this planning takes into consideration the particular frequencies a licensee is assigned.[52/] As noted above, small geographic areas present technical challenges that can be mitigated with larger license areas.

48/ *See, e.g., Media Bureau Announcing FM Translator Filing Window for Long-Form Applications*, Public Notice, DA 17-1069 (Nov. 1, 2017) (announcing the construction permit application filing window for Tech Box proposals that were not mutually exclusive with any other Tech Box proposals from the Auction 99 filing window, and noting that these applications are exempt from the Commission's auction procedures).

49/ 47 U.S.C. § 309(j).

50/ *See* 47 C.F.R. § 96.25.

51/ *See NPRM* ¶ 49.

52/ *See* T-Mobile Petition for Reconsideration at 15.

The same is true with respect to a static – rather than dynamic – adjacent spectrum block environment. Having a known adjacent spectrum block user – both in the same and adjacent geographic areas – will allow for better coordination of technologies and maximum spectrum use. Co-channel licensees in adjacent geographic areas often agree between themselves on mechanisms for maximizing each entities' spectrum use, including, for example, deployment of downtilt antennas and an agreed-upon azimuth modification. In contrast, a dynamic spectrum environment will produce a continually changing interference environment, meaning that licensees will be unable to negotiate spectrum use arrangements and will be required to comply with Commission, SAS and industry guidelines, which will certainly be more restrictive than can be negotiated among adjacent channel block licensees, leading to less intense spectrum use. As with licenses covering too-small geographic areas, licensees in a dynamic spectrum environment may also require the introduction of guard bands, inefficient scheduling or other mechanisms, all of which will reduce the efficient use of spectrum and its benefits to the American consumer. Instead, allowing applicants to bid on particular blocks will provide licensees with access to the same spectrum blocks on a consistent basis, enhancing their ability to plan network deployment. This will increase interest and investment in the 3.5 GHz band by potential licensees and support the purposes of the longer license term with renewal expectancy, larger geographic area, and other changes proposed for PALs. Accordingly, applicants should be able to bid on and hold specific spectrum blocks within the 3.5 GHz band.

The Commission has designated the entire 100 megahertz band 3550-3650 MHz for PAL operations, even though it will only issue 70 megahertz of PAL licenses per market area.[53/] To promote consistent spectrum use across geographic areas, the Commission should only assign

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53/ *See* 47 C.F.R. § 96.11(2).

through auction the seven PALs in the first 70 megahertz of the 3.5 GHz band spectrum (3550-3620 MHz) and permit bidders to bid on any of these seven PAL licenses. The remaining 30 megahertz of spectrum in which PAL licensees may operate (3620-3650 GHz) should be used by SASs to assign PAL licensees spectrum when they are preempted by incumbent use. Under this approach, a SAS would re-assign the PAL licensee temporarily while the licensee's licensed channels are unavailable. When not in use by PAL licensees, this 30 megahertz of spectrum (like all of the PAL spectrum when not in use) would be available for GAA operations. This will create consistency across both licensed and unlicensed operations, preserving PAL licensees' use of the amount of spectrum for which they are licensed, and preempting GAA use of the additional 30 megahertz only when a PAL licensee is unable to use its own spectrum.

Allowing PAL bidders to select particular channel blocks will preserve SAS Administrators' role in dynamically preventing interference among different user tiers. A SAS will still perform the key functions of limiting PAL use when required to protect incumbent licensees and facilitating GAA access to the band. In fact, it will be able to perform these functions in a more stable and predictable spectrum environment.

There is no need for the two-phase process used in the Incentive Auction, nor is there a need for rules that favor contiguous spectrum. As is typical practice in other auctions, bidders can take any preferences for contiguous spectrum and particular frequencies into account in their bidding strategy. While the assignment phase of the Incentive Auction was useful in that case, it added a layer of complexity not necessary in this instance.

VIII. EMISSION MASKS SHOULD BE RELAXED

The Commission's rules currently set a -13 dBm/MHz emission limit for frequencies from 0 to 10 megahertz outside the channel edge; a -25 dBm/MHz emission limit for frequencies more than 10 megahertz outside the channel edge, down to 3530 MHz and up to 3720 MHz; and a -40 dBm/MHz emission limit below 3530 and above 3720 MHz.[54/] The *NPRM* proposes to relax these limits in order to accommodate wider bandwidths and seeks comment on two proposals:

- Qualcomm's proposal that for single or aggregated channels that are the channel bandwidth (B) megahertz wide (up to 40 megahertz), the -13 dBm/MHz requirement should apply from 0 to B megahertz above and below the channel edges, and the -25 dBm/MHz requirement should apply at frequencies beyond B megahertz, with no change to the -40 dBm/MHz limit.
- A more graduated reduction of
  - -13 dBm/MHz from 0 to B/2 (*i.e.*, 50% of B) megahertz from the assigned channel edge;
  - -20 dBm/MHz from B/2 to B (*i.e.*, 100% of B) megahertz from the assigned channel edge;
  - -25 dBm/MHz beyond B megahertz from the assigned channel edge, down to 3530 megahertz and up to 3720 megahertz;
  - -40 dBm/MHz below 3530 MHz and above 3720 MHz.

Wider bandwidths will be critical for 5G operations. The current emission limits, however, will force licensees deploying 20 megahertz (or wider) channels to operate at half-power and engage in power reduction, which will in turn threaten coverage, diminish the utility of the band, undermine an operator's ability to offer wider bandwidths to support 5G and, as a result, depress deployment. Relaxed emission masks would accommodate wider bandwidths and – as the Commission acknowledges – promote innovation and investment in the band.[55/] The Commission should adopt Qualcomm's proposal to relax the emission masks. First, the

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54/ *See* 47 C.F.R. § 96.41(e).

55/ *NPRM* ¶ 54.

alternative graduated approach the Commission suggests will not necessarily be consistent with specifications adopted by the 3rd Generation Partnership Project ("3GPP"). Second, a graduated mask will require greater power back-off compared to the typical 3GPP mask and the mask proposed by Qualcomm. The additional power back-off will result in a reduction of transmission power which in turn will reduce the cell coverage area, increasing deployment costs. The optimum use of the 3.5 GHz band will be with greater than 10 megahertz wide channels for both LTE and 5G applications, meaning that if the proposed graduated approach is required, it will be used frequently, causing coverage area reduction that would greatly impact the utility of 3.5 GHz band for both LTE and 5G.

IX. CONCLUSIONS

T-Mobile appreciates the opportunity to provide comments on ways to maximize the utility of the 3.5 GHz band for 5G technologies. The Commission should move forward quickly and take the following actions:

- Authorize PALs on a standard, ten-year license term with a renewal expectancy.
- Adopt a performance requirement of coverage to 40% of the population for PALs.
- Use PEAs to license PALs.
- Impose a spectrum aggregation limit of 30 megahertz for PALs.
- Permit partitioning and disaggregation of PALs in secondary market transactions.
- Allow bidding on specific blocks within the first 70 megahertz of PAL spectrum at 3550-3620 MHz with the remaining 30 megahertz of PAL spectrum available on a priority basis in cases where a channel at 3550-3620 MHz becomes unavailable.
- Make all seven PALs available at auction, regardless of the number of applications received.
- Prohibit SAS Administrators from publicly disclosing CBSD registration information.
- Relax the emission limits that apply to CBSDs and end user devices.

Respectfully submitted,

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